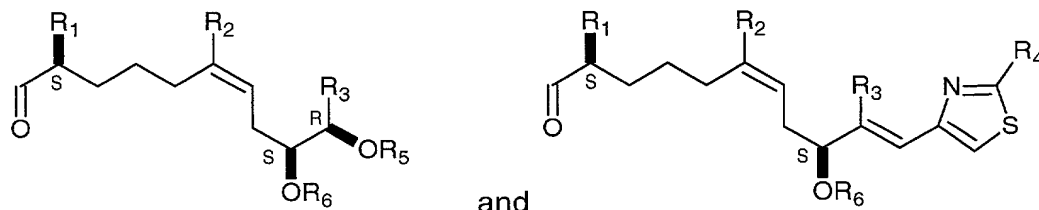


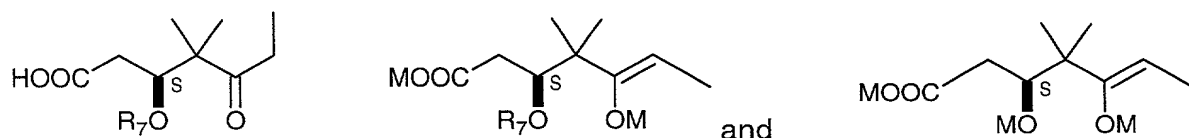
I claim:

1. A method for use in producing epothilones and analogs and derivatives thereof, comprising:

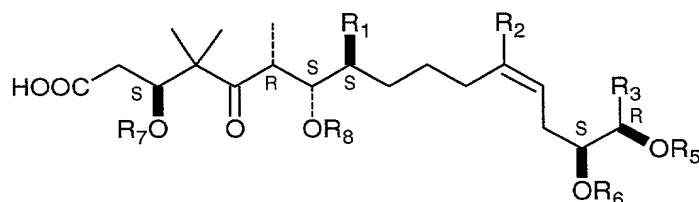
(a) performing an aldol condensation of a first compound selected from the formulas:



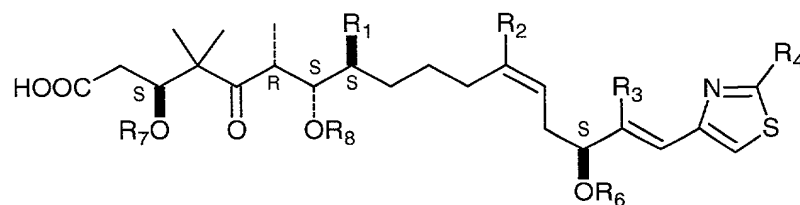
and stereoisomers thereof, with a second compound selected from the formulas:



and stereoisomers thereof, thereby to form a third compound selected from the formulas:

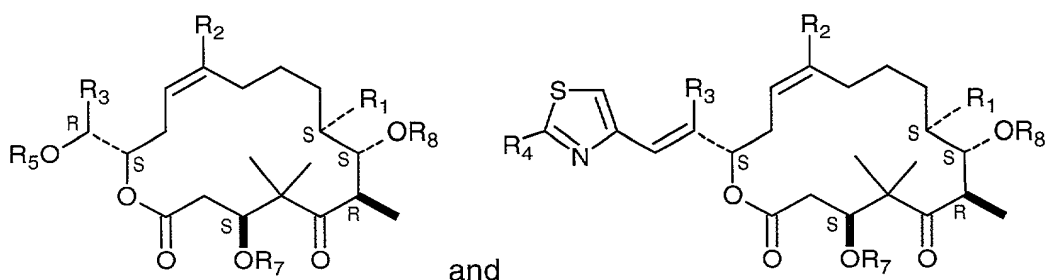


and



and stereoisomers thereof, wherein R₁, R₂, R₃ and R₄ are each selected from H, alkyl, alkenyl, alkynyl, aryl, cycloalkyl, heterocyclo, and substitutions thereof; wherein R₅, R₆, R₇ and R₈ are each selected from H and a protecting group; and wherein M is an alkali metal; and

(b) performing a macrolactonization of the third compound thereby to form a fourth compound selected from the formulas:



and stereoisomers thereof, wherein R_1 , R_2 , R_3 and R_4 are each selected from H, alkyl, alkenyl, alkynyl, aryl, cycloalkyl, heterocyclo, and substitutions thereof; and wherein R_5 , R_7 and R_8 are each selected from H and a protecting group.

2. A method according to claim 1 wherein R_1 , R_3 and R_4 are each methyl, and R_2 is H or methyl.

3. A method according to claim 2 wherein R_2 is H.

4. A method according to claim 2 wherein R_2 is methyl.

5. A method according to claim 2 wherein at least one of $R_5 - R_8$ is TBS.

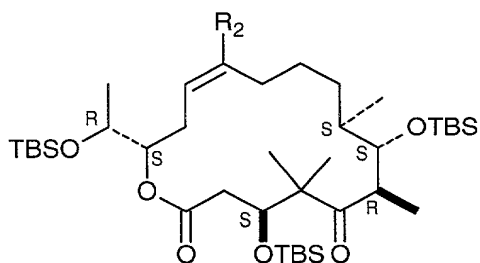
6. A method according to claim 2 wherein R_6 , R_7 and R_8 are each TBS.

7. A method according to claim 2 wherein R_5 is PMB.

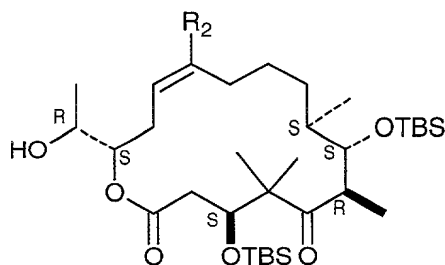
8. A method according to claim 2 wherein R_6 is SEM.

9. A method according to claim 1 wherein R_5 is selected from PMB, DPS and TBS; wherein R_6 is selected from H, TBS, TMS, TIPS, PMBM and SEM; wherein R_7 is selected from H, TBS, TROC, $-\text{CO}(\text{CH}_2)_4\text{CH}_3$ and $-\text{CO}(\text{CH}_2)_3\text{CH}=\text{CH}_2$; and wherein R_8 is selected from H and TBS.

10. A method according to claim 1 wherein said fourth compound is of a formula selected from:

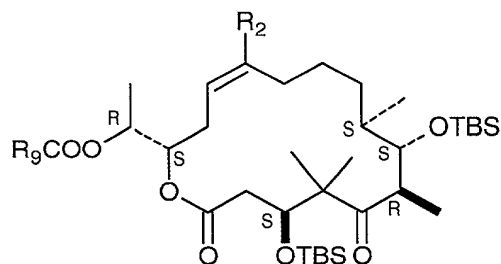


and stereoisomers thereof, where R_2 is H or methyl; and wherein said fourth compound is converted to a fifth compound of a formula selected from:



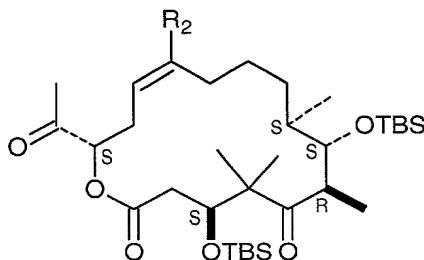
and stereoisomers thereof, where R_2 is H or methyl.

11. A method according to claim 10 wherein said fifth compound is converted to a sixth compound of a formula selected from:



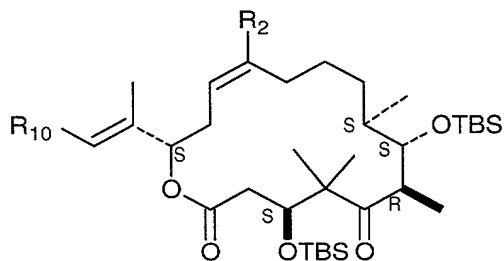
and stereoisomers thereof, where R_2 is H or methyl and wherein R_9 is selected from alkyl, alkenyl, alkynyl, aryl, cycloalkyl, heterocyclo, and substitutions thereof.

12. A method according to claim 10 wherein said fifth compound is converted to a sixth compound of a formula selected from:



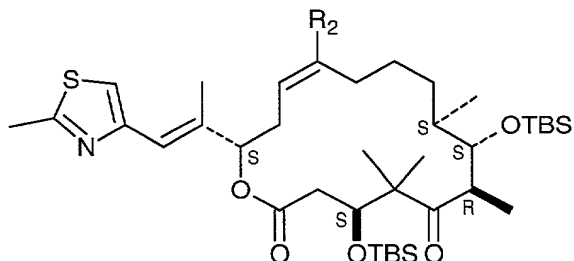
and stereoisomers thereof, where R_2 is H or methyl.

13. A method according to claim 12 wherein said fifth compound is converted to a sixth compound of a formula selected from:



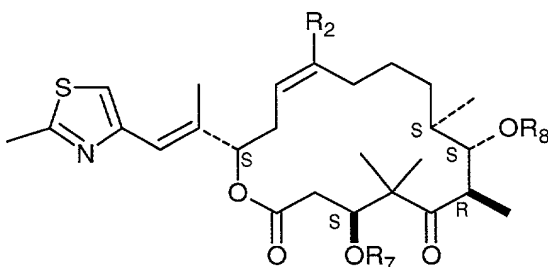
and stereoisomers thereof, where R_2 is H or methyl and wherein R_{10} is selected from alkyl, alkenyl, alkynyl, aryl, cycloalkyl, heterocyclo, and substitutions thereof.

14. A method according to claim 13 wherein said sixth compound is of a formula selected from:



and stereoisomers thereof, where R_2 is H or methyl.

15. A method according to claim 1 wherein said fourth compound is of a formula selected from:

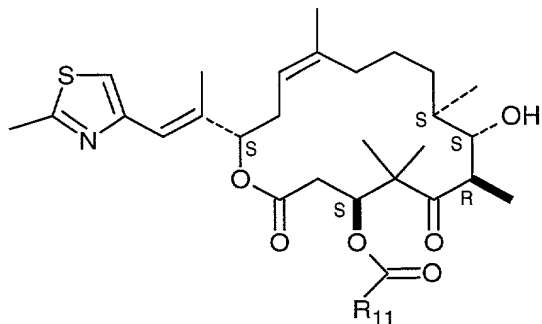


and stereoisomers thereof, where R_2 is H or methyl, R_7 is H or TBS, and R_8 is H, TBS, or TROC.

16. A method according to claim 15 wherein said fourth compound is further converted to Epothilone B.

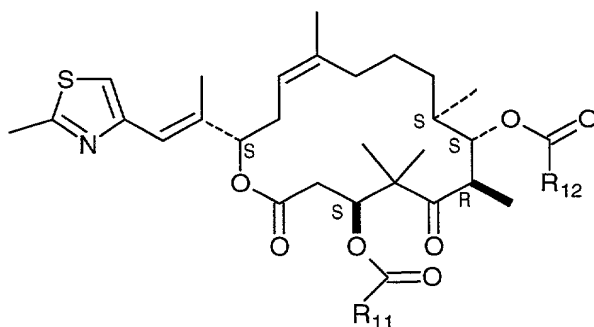
17. A method according to claim 15 wherein R_7 and R_8 each are H.

18. A method according to claim 17 wherein said fourth compound is further converted to a fifth compound of a formula selected from:



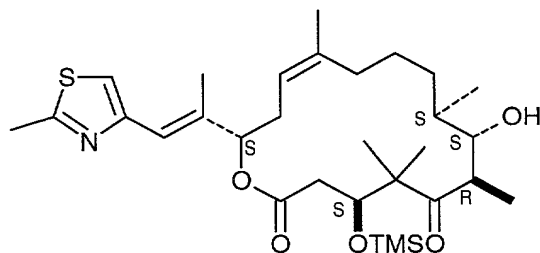
and stereoisomers thereof, wherein R_{11} is selected from alkyl, alkenyl, alkynyl, aryl, alkyl-aryl, alkyloxy, aryloxy, cycloalkyl, heterocyclo, amino, sulfo, and substitutions thereof.

19. A method according to claim 18 wherein said fifth compound is further converted to a sixth compound of a formula selected from:



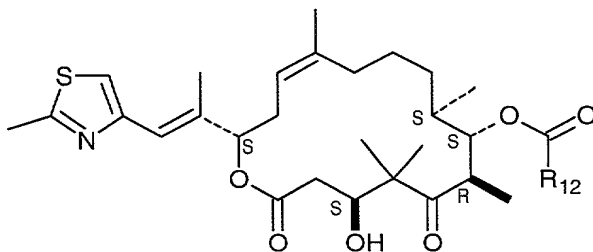
and stereoisomers thereof, wherein R_{11} and R_{12} are each selected from alkyl, alkenyl, alkynyl, aryl, alkyl-aryl, alkyloxy, aryloxy, cycloalkyl, heterocyclo, amino, sulfo, and substitutions thereof.

20. A method according to claim 17 wherein said fourth compound is further converted to a fifth compound of a formula selected from:



and stereoisomers thereof.

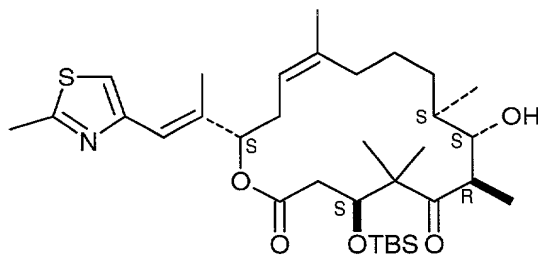
21. A method according to claim 20 wherein said fifth compound is further converted to a sixth compound of a formula selected from:



and stereoisomers thereof, wherein R_{12} is selected from alkyl, alkenyl, alkynyl, aryl, alkyl-aryl, alkyloxy, aryloxy, cycloalkyl, heterocyclo, amino, sulfo, and substitutions thereof.

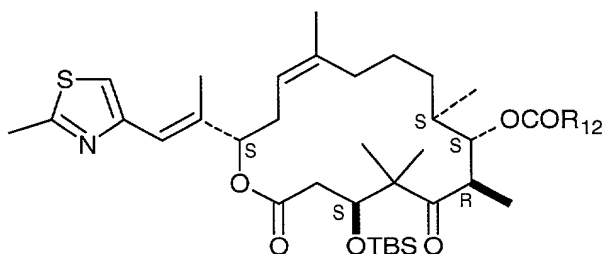
22. A method according to claim 15 wherein R_7 is TBS and R_8 is TROC.

23. A method according to claim 22 wherein said fourth compound is further converted to a fifth compound of a formula selected from:



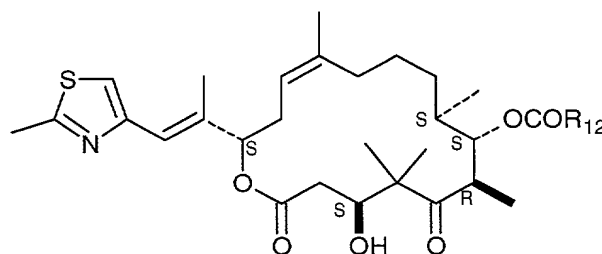
and stereoisomers thereof.

24. A method according to claim 23 wherein said fifth compound is further converted to a sixth compound of a formula selected from:



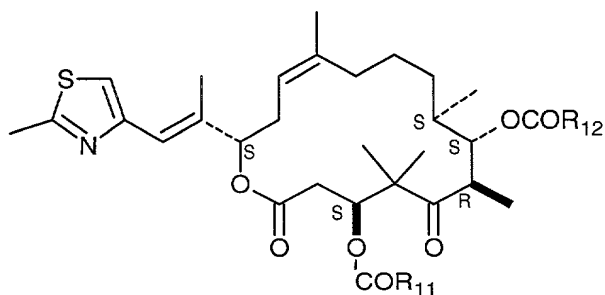
and stereoisomers thereof, wherein R_{12} is selected from alkyl, alkenyl, alkynyl, aryl, alkyl-aryl, alkyloxy, aryloxy, cycloalkyl, heterocyclo, amino, sulfo, and substitutions thereof.

25. A method according to claim 24 wherein said sixth compound is further converted to a seventh compound of a formula selected from:



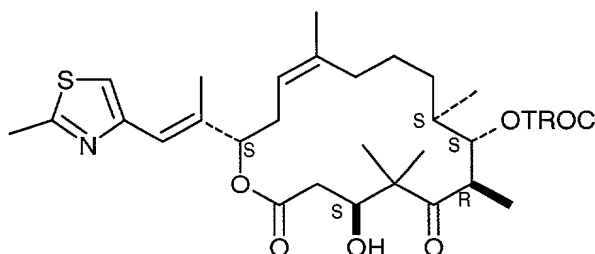
and stereoisomers thereof, wherein R_{12} is selected from alkyl, alkenyl, alkynyl, aryl, alkyl-aryl, alkyloxy, aryloxy, cycloalkyl, heterocyclo, amino, sulfo, and substitutions thereof.

26. A method according to claim 25 wherein said seventh compound is further converted to an eighth compound of a formula selected from:



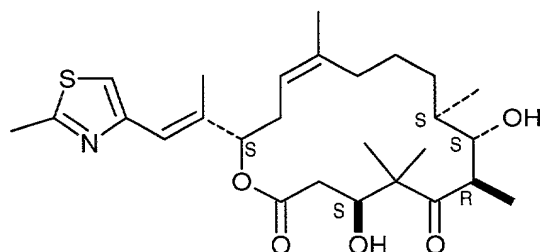
and stereoisomers thereof, wherein R_{11} and R_{12} are each selected from alkyl, alkenyl, alkynyl, aryl, alkyl-aryl, alkyloxy, aryloxy, cycloalkyl, heterocyclo, amino, sulfo, and substitutions thereof.

27. A method according to claim 22 wherein said fourth compound is further converted to a fifth compound of a formula selected from:



and stereoisomers thereof.

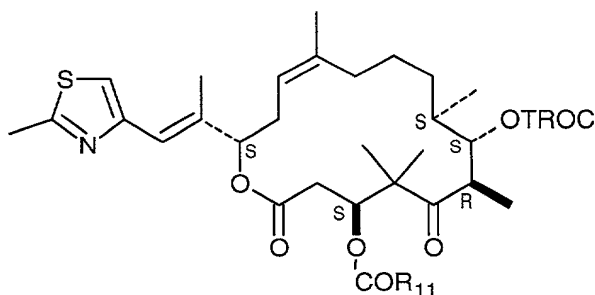
28. A method according to claim 27 wherein said fifth compound is further converted to a sixth compound of a formula selected from:



and stereoisomers thereof.

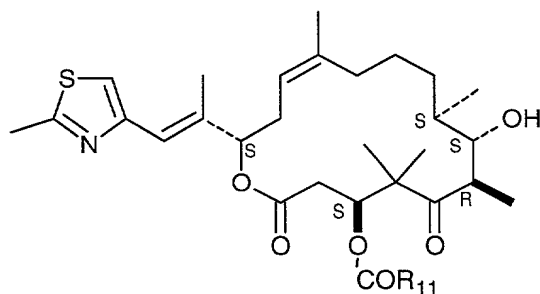
29. A method according to claim 28 wherein said sixth compound is further converted to Epothilone B.

30. A method according to claim 27 wherein said fifth compound is further converted to a sixth compound of a formula selected from:



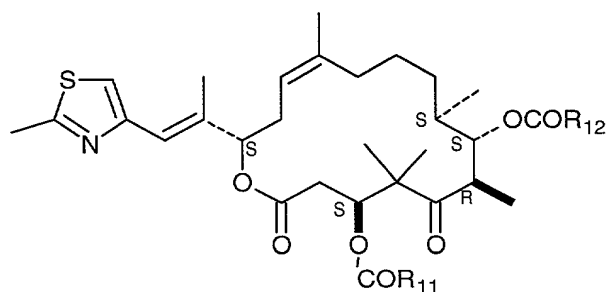
and stereoisomers thereof, wherein R_{11} is selected from alkyl, alkenyl, alkynyl, aryl, alkyl-aryl, alkyloxy, aryloxy, cycloalkyl, heterocyclo, amino, sulfo, and substitutions thereof.

31. A method according to claim 30 wherein said sixth compound is further converted to a seventh compound of a formula selected from:



and stereoisomers thereof, wherein R_{11} is selected from alkyl, alkenyl, alkynyl, aryl, alkyl-aryl, alkyloxy, aryloxy, cycloalkyl, heterocyclo, amino, sulfo, and substitutions thereof.

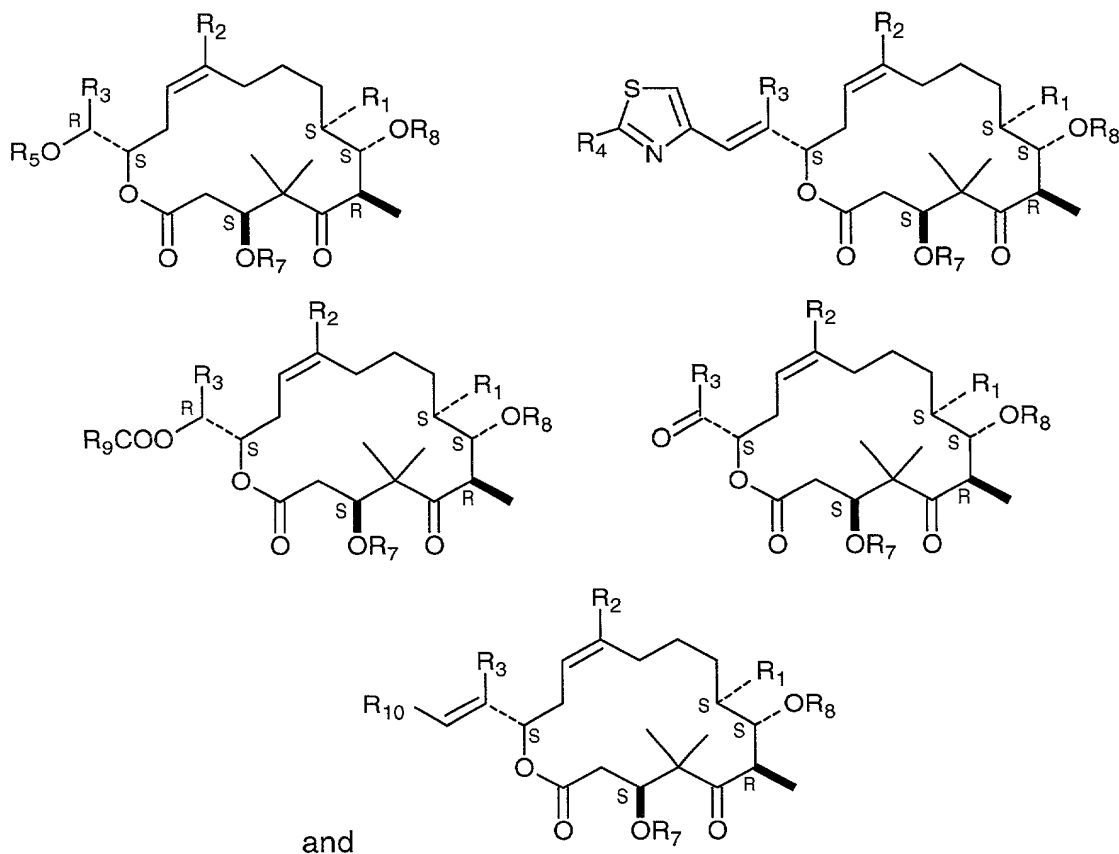
32. A method according to claim 31 wherein said seventh compound is further converted to an eighth compound of a formula selected from:



and stereoisomers thereof, wherein R_{11} and R_{12} are each selected from alkyl, alkenyl, alkynyl, aryl, alkyl-aryl, alkyloxy, aryloxy, cycloalkyl, heterocyclo, amino, sulfo, and substitutions thereof.

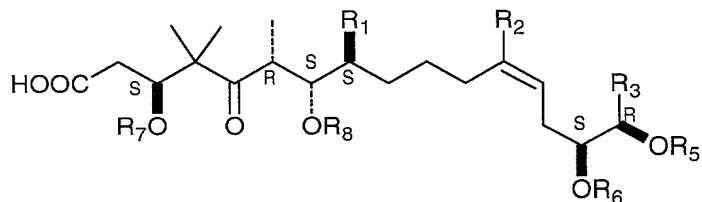
33. A chemical compound formed according to the method of claim 1.

34. A chemical compound according to claim 33 wherein said compound is selected from the formulas:

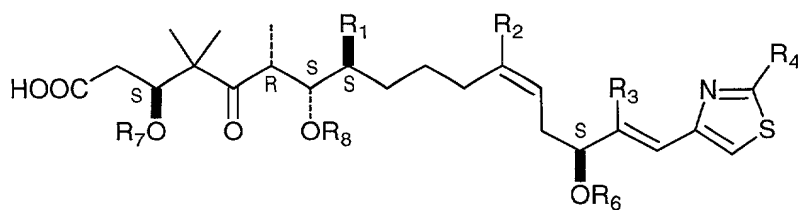


and stereoisomers thereof, wherein R_1 , R_2 , R_3 and R_4 are each selected from H, alkyl, alkenyl, alkynyl, aryl, cycloalkyl, heterocyclo, and substitutions thereof; wherein R_5 and R_6 are each selected from H and a protecting group; wherein R_7 is selected from H, a protecting group and COR_{11} ; wherein R_8 is selected from H, a protecting group and COR_{12} ; wherein R_9 is selected from alkyl, alkenyl, alkynyl, aryl, cycloalkyl, heterocyclo, and substitutions thereof; wherein R_{10} is selected from alkyl, alkenyl, alkynyl, aryl, cycloalkyl, heterocyclo, and substitutions thereof; and wherein R_{11} and R_{12} are each selected from alkyl, alkenyl, alkynyl, aryl, alkyl-aryl, alkyloxy, aryloxy, cycloalkyl, heterocyclo, amino, sulfo, and substitutions thereof.

35. A chemical compound having a formula selected from:



and



and stereoisomers thereof, wherein R₁, R₂, R₃ and R₄ are each selected from H, alkyl, alkenyl, alkynyl, aryl, cycloalkyl, heterocyclo, and substitutions thereof; and wherein R₅, R₆, R₇ and R₈ are each selected from H and a protecting group.

36. A chemical compound according to claim 35 wherein R₁, R₃ and R₄ are each methyl, and R₂ is H or methyl.

37. A chemical compound according to claim 36 wherein R₂ is H.

38. A chemical compound according to claim 36 wherein R₂ is methyl.

39. A chemical compound according to claim 36 wherein at least one of R₅ - R₈ is TBS.

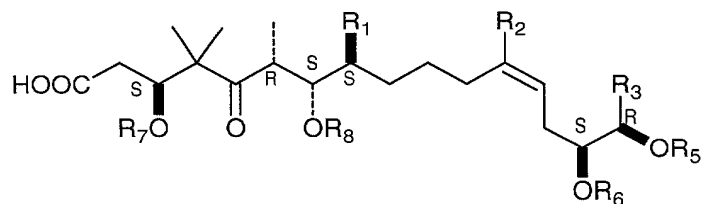
40. A chemical compound according to claim 36 wherein R₆, R₇ and R₈ are each TBS.

41. A chemical compound according to claim 36 wherein R₅ is PMB.

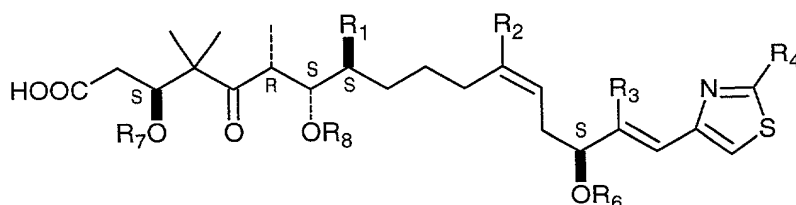
42. A chemical compound according to claim 36 wherein R₆ is SEM.

43. A chemical compound according to claim 35 wherein R₅ is selected from PMB, DPS and TBS; wherein R₆ is selected from H, TBS, TMS, TIPS, PMBM and SEM; wherein R₇ is selected from H, TBS, TROC, and -CO(CH₂)₄CH₃; and wherein R₈ is selected from H, TBS and TROC.

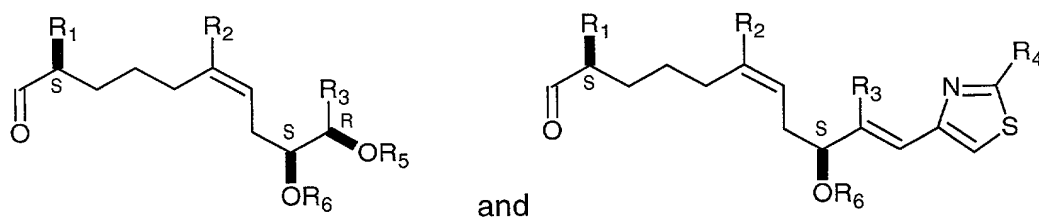
44. A method for producing a chemical compound having a formula selected from



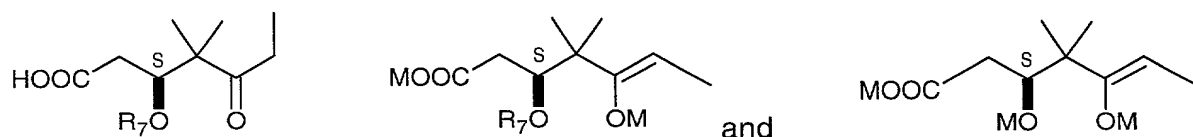
and



and stereoisomers thereof, which is useful in producing epothilones and analogs and derivatives thereof, comprising performing an aldol condensation of a first compound selected from the formulas:



with a second compound selected from the formulas:



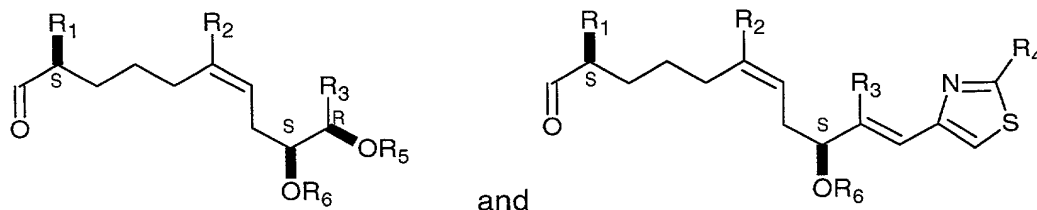
wherein R_1 , R_2 , R_3 and R_4 are each selected from H, alkyl, alkenyl, alkynyl, aryl, cycloalkyl, heterocyclo, and substitutions thereof; wherein R_5 , R_6 , R_7 and R_8 are each selected from H and a protecting group; and wherein M is an alkali metal.

45. A method according to claim 44 wherein M is Li.

46. A method according to claim 44 wherein R_1 , R_3 and R_4 are each methyl and wherein R_2 is H or methyl.

47. A method according to claim 44 wherein R_5 is selected from PMB, DPS and TBS; wherein R_6 is selected from H, TBS, TMS, TIPS, PMBM and SEM; wherein R_7 is selected from H, TBS, TROC, and $-\text{CO}(\text{CH}_2)_4\text{CH}_3$; and wherein R_8 is selected from H, TBS and TROC.

48. A chemical compound having a formula selected from:



and stereoisomers thereof, wherein R₁, R₂, R₃ and R₄ are each selected from H, alkyl, alkenyl, alkynyl, aryl, cycloalkyl, heterocyclo, and substitutions thereof; and wherein R₅ and R₆ are each selected from H and a protecting group.

49. A chemical compound according to claim 48 wherein R₁, R₃ and R₄ are each methyl and wherein R₂ is H or methyl.

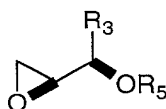
50. A chemical compound according to claim 48 wherein R₅ is selected from PMB, DPS and TBS; and wherein R₆ is selected from H, TBS, TMS, TIPS, PMBM and SEM.

51. A chemical compound according to claim 48 wherein R₁, R₃ and R₄ are each methyl; wherein R₂ is H or methyl; wherein R₅ is selected from PMB, DPS and TBS; and wherein R₆ is selected from H, TBS, TMS, TIPS, PMBM and SEM.

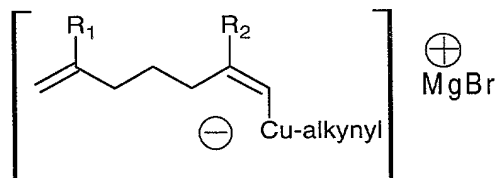
52. A chemical compound according to claim 51 wherein R₅ is selected from TBS and DPS and wherein R₆ is selected from TMS, TBS and PMB.

53. A process for producing a chemical compound useful in producing epothilones and analogs and derivatives thereof, comprising:

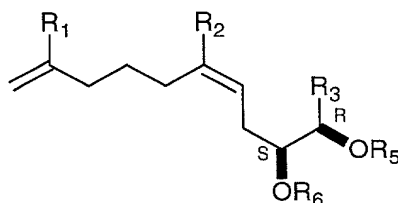
(a) reacting a first compound of a formula selected from:



and stereoisomers thereof, with a second compound of a formula:

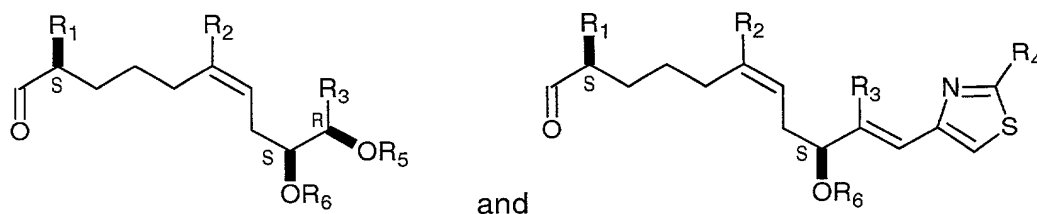


thereby to form a third compound of a formula selected from:



and stereoisomers thereof, wherein R₁, R₂, and R₃ are each selected from H, alkyl, alkenyl, alkynyl, aryl, cycloalkyl, heterocyclo, and substitutions thereof; and wherein R₅ and R₆ are each selected from H and a protecting group; and

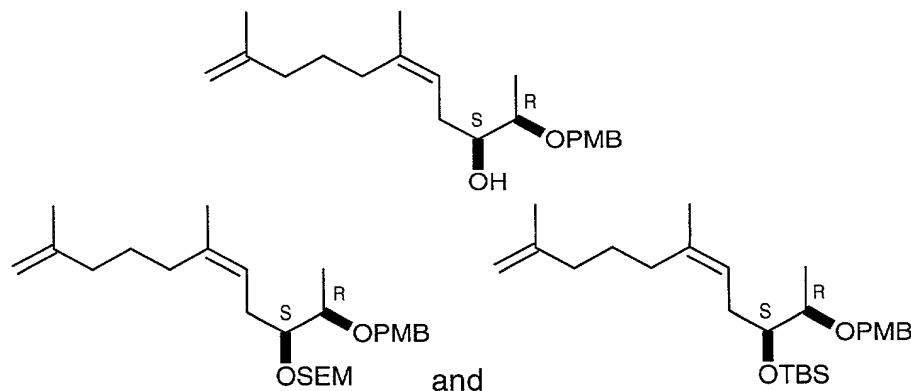
(b) converting said third compound into a fourth compound of a formula selected from:



and stereoisomers thereof, wherein R_1 , R_2 , R_3 and R_4 are each selected from H, alkyl, alkenyl, alkynyl, aryl, cycloalkyl, heterocyclo, and substitutions thereof; and wherein R_5 and R_6 are each selected from H and a protecting group.

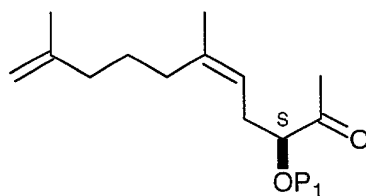
54. A method according to claim 53 wherein R_1 , R_3 and R_4 are each methyl; wherein R_2 is H or methyl; wherein R_5 is selected from PMB, DPS and TBS; and wherein R_6 is selected from H, TBS, TMS, TIPS, PMBM and SEM.

55. A method according to claim 53 wherein said third compound is of a formula selected from:

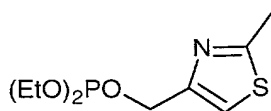


and stereoisomers thereof.

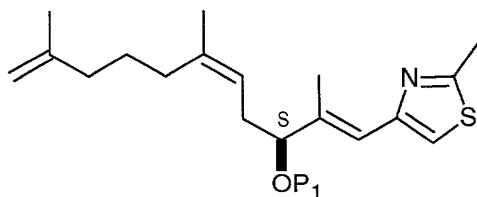
56. A method according to claim 55 wherein said third compound is further converted to a compound of formula:



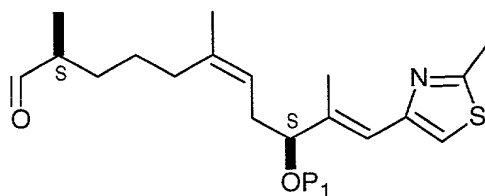
which is thereafter reacted with a compound of formula:



thereby to form a compound of formula:



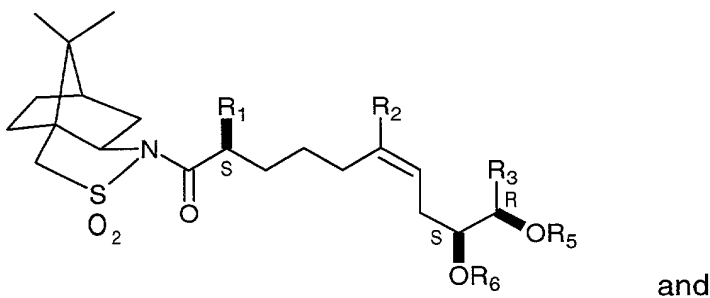
which is thereafter converted to said fourth compound of formula:



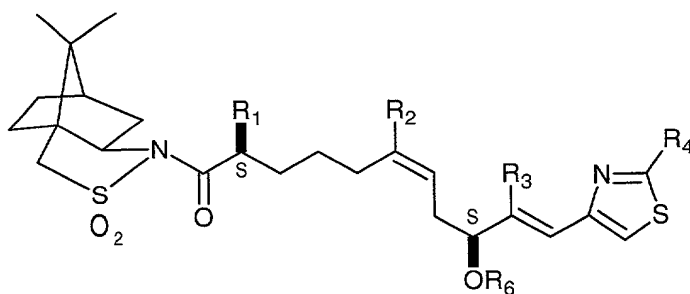
wherein P_1 is selected from TBS and SEM.

57. A process for producing a chemical compound useful in producing epothilones and analogs and derivatives thereof, comprising:

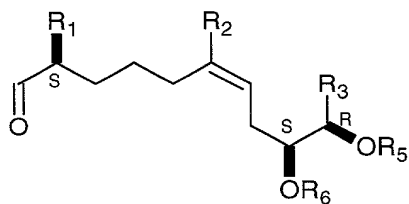
(a) converting a first compound of a formula selected from:



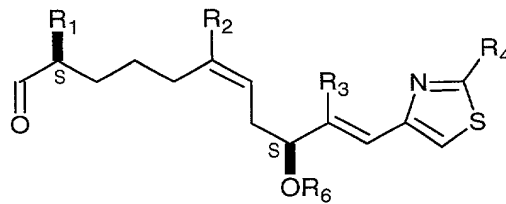
and



and stereoisomers thereof, to a second compound of a formula selected from

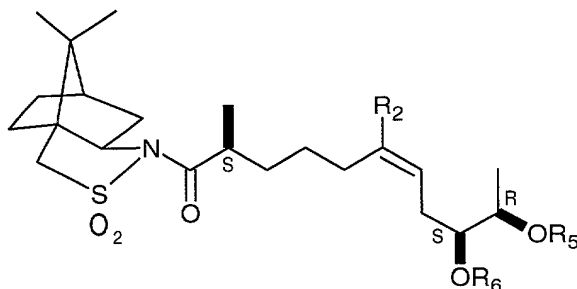


and



and stereoisomers thereof, wherein R_1 , R_2 , R_3 and R_4 are each selected from H, alkyl, alkenyl, alkynyl, aryl, cycloalkyl, heterocyclo, and substitutions thereof; and wherein R_5 and R_6 are each selected from H and a protecting group.

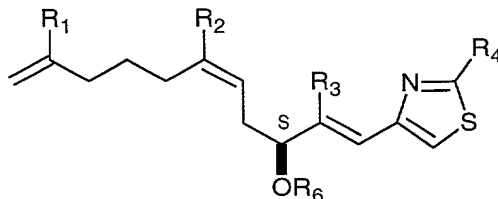
58. A method according to claim 57 wherein said first compound is of formula:



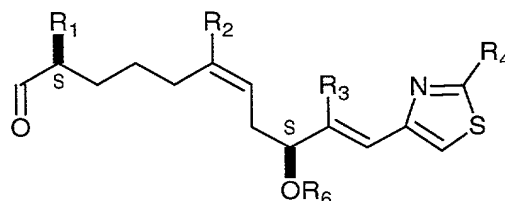
wherein R_2 is selected from H and methyl, R_5 is selected from TBS and DPS and wherein R_6 is selected from TMS and TBS.

59. A process for producing a chemical compound useful in producing epothilones and analogs and derivatives thereof, comprising:

(a) converting a first compound of a formula:



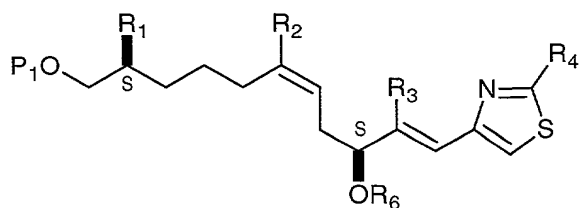
to a second compound of a formula selected from



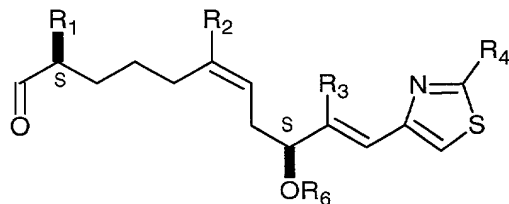
and stereoisomers thereof, wherein R_1 , R_2 , R_3 and R_4 are each selected from H, alkyl, alkenyl, alkynyl, aryl, cycloalkyl, heterocyclo, and substitutions thereof; and wherein R_6 is selected from H and a protecting group.

60. A process for producing a chemical compound useful in producing epothilones and analogs and derivatives thereof, comprising:

(a) converting a first compound of a formula selected from:



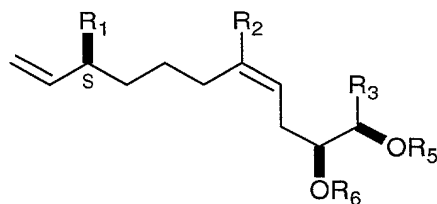
and stereoisomers thereof, to a second compound of a formula selected from



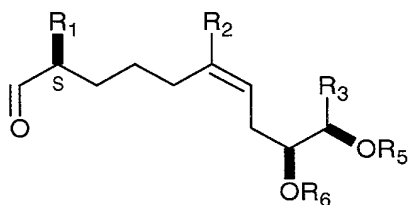
and stereoisomers thereof, wherein R_1 , R_2 , R_3 and R_4 are each selected from H, alkyl, alkenyl, alkynyl, aryl, cycloalkyl, heterocyclo, and substitutions thereof; and wherein P_1 and R_6 are each selected from H and a protecting group.

61. A process for producing a chemical compound useful in producing epothilones and analogs and derivatives thereof, comprising:

(a) converting a first compound of a formula selected from:

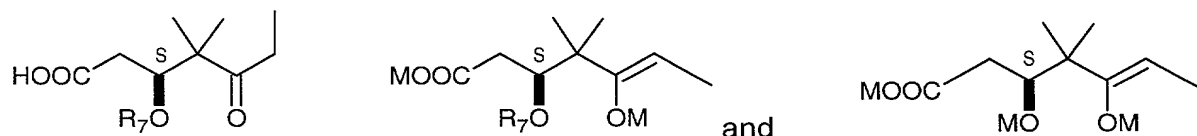


and stereoisomers thereof, to a second compound of a formula selected from



and stereoisomers thereof, wherein R_1 , R_2 , and R_3 are each selected from H, alkyl, alkenyl, alkynyl, aryl, cycloalkyl, heterocyclo, and substitutions thereof; and wherein R_5 and R_6 are each selected from H and a protecting group.

62. A chemical compound having a formula selected from:



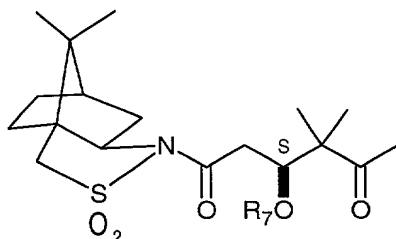
wherein M is an alkali metal and wherein R_7 is selected from H and a protecting group.

63. A chemical compound according to claim 62 wherein M is Li.

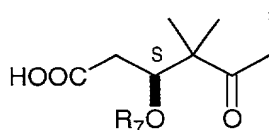
64. A chemical compound according to claim 62 wherein R₇ is selected from H and TBS.

65. A process for producing a chemical compound useful in producing epothilones and analogs and derivatives thereof, comprising

(a) converting a first compound of a formula:



to a second compound of a formula:

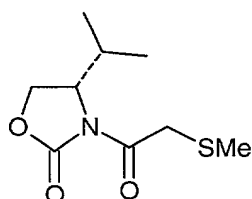


wherein R₇ is selected from H and a protecting group.

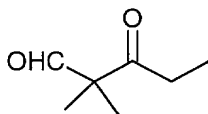
66. A method according to claim 65 wherein R₇ is TBS.

67. A process for producing a chemical compound useful in producing epothilones and analogs and derivatives thereof, comprising

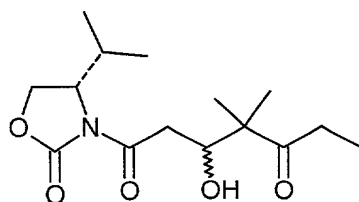
(a) reacting a first compound of a formula:



with a second compound of a formula:

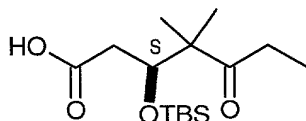


thereby to form a third compound of a formula:



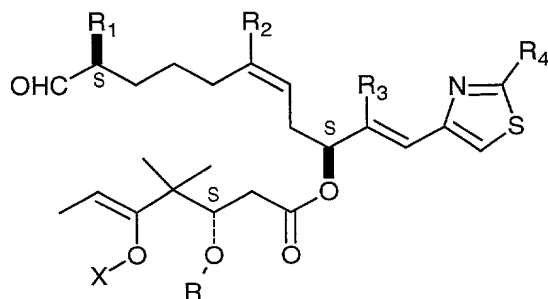
and

- (b) converting said third compound to a fourth compound of a formula:

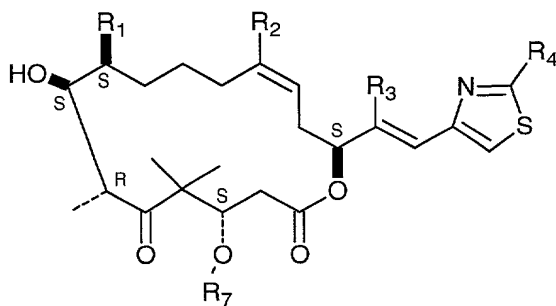


68. A process for use in producing epothilones and analogs and derivatives thereof, comprising:

- (a) converting a first compound of a formula selected from:

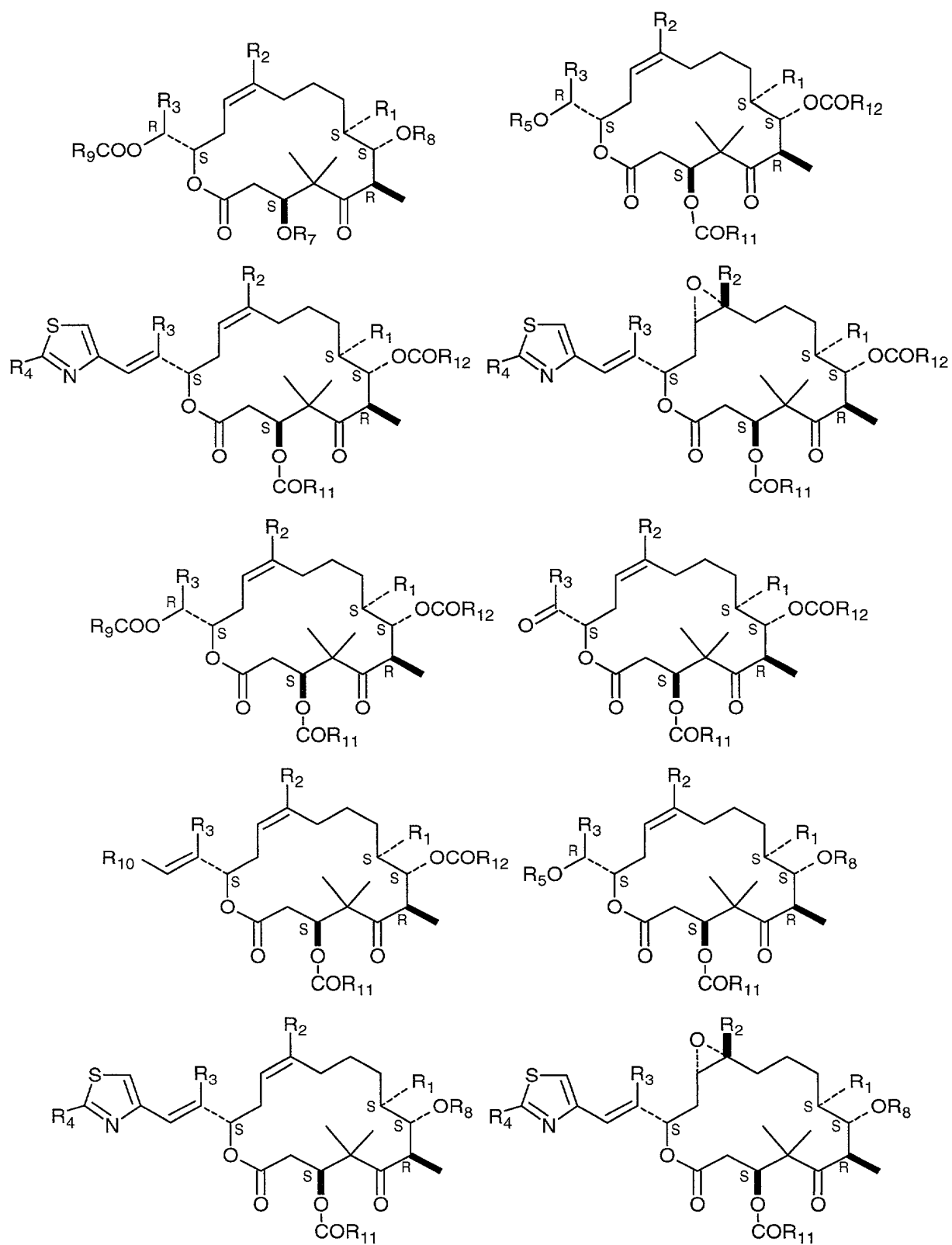


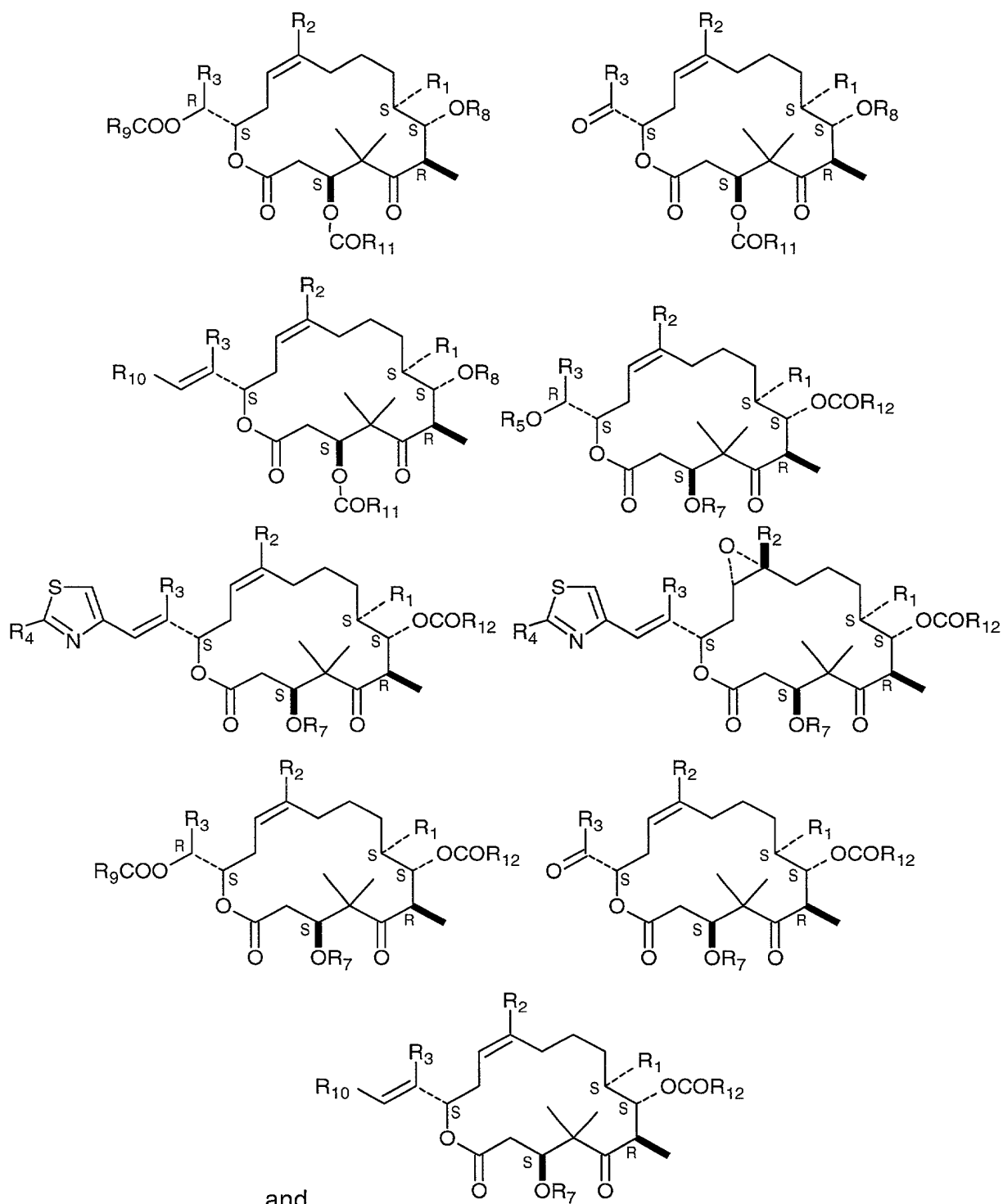
and stereoisomers thereof to a second compound of a formula selected from:



and stereoisomers thereof, wherein R_1 , R_2 , R_3 and R_4 are each selected from H, alkyl, alkenyl, alkynyl, aryl, cycloalkyl, heterocyclo, and substitutions thereof; and wherein R_7 is selected from H and a protecting group.

69. A chemical compound having a formula selected from:





and stereoisomers thereof, wherein R₁, R₂, R₃ and R₄ are each selected from H, alkyl, alkenyl, alkynyl, aryl, cycloalkyl, heterocyclo, and substitutions thereof; wherein R₅, R₆, R₇ and R₈ are each selected from H and a protecting group; wherein R₉ is selected from alkyl, alkenyl, alkynyl, aryl, cycloalkyl, heterocyclo, and substitutions thereof; wherein

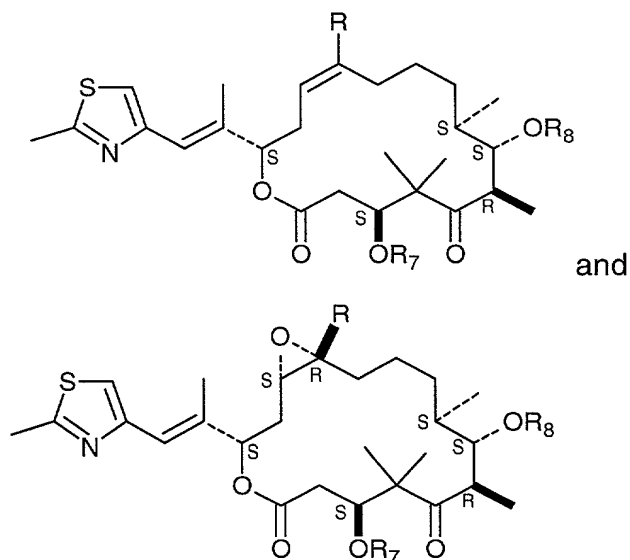
R₁₀ is selected from alkyl, alkenyl, alkynyl, aryl, cycloalkyl, heterocyclo, and substitutions thereof; and wherein R₁₁ and R₁₂ are each selected from alkyl, alkenyl, alkynyl, aryl, alkyl-aryl, alkyloxy, aryloxy, cycloalkyl, heterocyclo, amino, sulfo, and substitutions thereof.

70. A chemical compound according to claim 69 wherein at least one of R₁₁ and R₁₂ is selected from $-(CH_2)_xCH_3$ and $-(CH_2)_yCH=CH_2$, where x and y are integers.

71. A chemical compound according to claim 69 wherein x and y are selected from the integers 3 and 4.

72. A chemical compound according to claim 70 wherein x is 4 and y is 3.

73. A chemical compound having a formula selected from:



and stereoisomers thereof, wherein R is H or methyl, R₇ is H or COR₁₁, R₈ is H or COR₁₂, and wherein R₁₁ and R₁₂ are each selected from $-(CH_2)_4CH_3$ and $-(CH_2)_3CH=CH_2$.